

Research Summary

Optimizing Missouri's Statewide Transportation Improvement Program Letting and Construction Schedule

Missouri's letting calendar can be tuned to draw stronger competition and reliably lower award costs while staying within existing policies and delivery practices. The core idea is simple and proven: use history to learn how markets respond to workload by month, then schedule next year's projects where bids are most favorable while respecting practical limits.

For this research, historical bid outcomes were used to estimate monthly "performance curves" that relate the share of work offered in a month to observed price behavior.

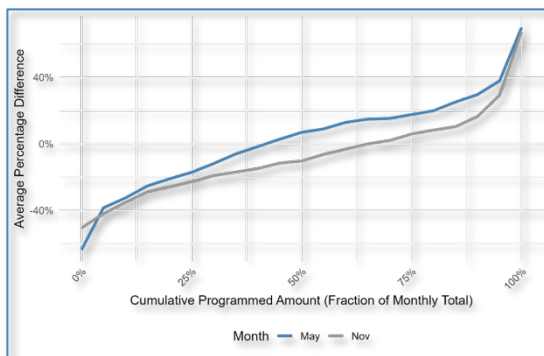
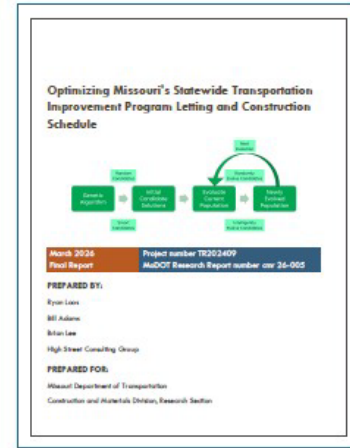


Figure 1 – Sample Performance Curves

A genetic-algorithm was used to place projects across eleven monthly lettings to minimize expected award totals while honoring constraints such as historical monthly shares, district balance, project-type timing targets, and



treatment of large projects. Contractor capacity was captured implicitly through the curves and examined directly through a backlog-based probabilistic bidding check. Constraints were developed in combination of discussion with MoDOT and representatives of the contractor community.

Across fiscal years, optimized calendars consistently reduced expected annual awards. Depending on the year and the constraint set, scaled **savings ranged from about \$5M to \$105M, which corresponds to a 6.3 to 8 percent of the program**, on average.

These gains did not require exotic assumptions or special data. They came from placing the same projects in months where the market has historically priced similar work more competitively, while keeping within reasonable guardrails.

Because the research optimization method relies on standard program and bid data, it is portable. **Any state DOT can build its own curves**, calibrate the optimization to local practice, and run the same playbook.

Uncertainty was examined with multiple Monte Carlo experiments. Reordering projects within months and randomly placing them on the performance curves produced results that tracked the optimization closely, which indicates that the curves already reflect the capacity effects that

drive prices. A contractor backlog simulation reached similar conclusions using a very different mechanism, which strengthens confidence in the curve-based approach. A schedule slippage stress test provided a clear operational signal. Randomly **delaying about ten percent of projects raised annual costs by roughly 2 to 3 percent.**

Key recommendations from the research include:

- 1.) Favor fall and winter lettings where feasible.
- 2.) Stick to the schedule and adopt a schedule adherence policy and milestone tracking. Delayed projects can cost millions.
- 3.) Advertise projects as early as possible, with as much detail as possible, and expand district contractor meetings.
- 4.) Don't pivot too quickly. Based on contractor input, and peer state experience, sudden changes in letting practice can have negative consequences.
- 5.) Operationalize the research with a lightweight tool and use research heatmaps over rules of thumb.

An optimization tool could load the annual project list, apply calibrated performance curves and simple targets, respect required guardrails, and produce a draft schedule with transparent trade-offs. Users could toggle constraints, see how the calendar shifts, and observe the expected impact on award totals. The same tool could run rapid what-if checks during the year when a project threatens to slip. If a move pushes the calendar into a high-cost month, the tool would quantify the premium, which supports decisions to adjust scope, shift internal resources, or hold the line.

A one-season pilot would validate parameters in practice, confirm savings, and establish a repeatable process that protects purchasing power, improves predictability for industry, and gives leadership a defensible way to plan, explain, and adjust the letting calendar.

Project Information

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